

Claims 23, 33 and 65 stand rejected under 35 USC 102(e) as being clearly anticipated by Cox (US 6064137).

CLAIM REJECTION - 35 USC 103(a).

Claim 3 stands rejected as being unpatentable over H&G, Kennel, Fitzpatrick or DiMatteo in further view of Rason et al (US 3843896). Claim 17 stands rejected as being unpatentable over DiMatteo in further view of Cox (US 6064137). Claims 25, 26, and 54-56 stand rejected as being unpatentable over DiMatteo or H&G or Fitzpatrick. Claims 28-32 stand rejected as being unpatentable over Fitzpatrick in further view of Richards (US 4281280) and Edelson (US 5874039). Claims 29-32 stand rejected as being unpatentable over Rason in further view of Richards and Edelson. Claim 34 stands rejected as being unpatentable over Cox. Claim 36 stands rejected as being unpatentable over Cox in further view of Fitzpatrick et al. Claim 37 stands rejected as being unpatentable over Fitzpatrick (US 4667126) in further view of Fitzpatrick et al. Claim 51 stands rejected as being unpatentable over Fitzpatrick et al and Richards. Claim 52 stands rejected as being unpatentable over Fitzpatrick et al and Sliwa (US5307311). Claims 57-60 stand rejected as being unpatentable over Fitzpatrick et al and Richards. Claim 61 stands rejected as being unpatentable over Fitzpatrick et al and Cox, and Richards. Claims 67 and 68 stand rejected as being unpatentable over Cox.

REQUEST FOR RECONSIDERATION

Applicant acknowledges with appreciation that the Examiner has indicated that claim 6 is allowed, and that claims 35 and 66 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims; however Applicant believes Examiner's objections to the base claim and intervening claims have been overcome.

Applicant also acknowledges with appreciation that Examiner has indicated that Applicant's argument regarding Fitzpatrick and the replicated surface variations of the electrodes is not persuasive because the limitation has not been claimed, and that Applicant's argument regarding Cox and the duplication of minor surface variations from one surface to the other is not persuasive because the limitation has not been claimed.

No new matter is added by these amendments and cancellations and they are fully supported by the specification as filed. Applicant respectfully requests entry of these amendments and cancellations. Further, applicant respectfully requests that the Examiner reconsider the above-captioned patent application in view of the foregoing amendments and the following remarks.

CLAIM REJECTION - 35 USC 102(b) Kennel (US 5410166)

Claims 1, 2 and 7 stand rejected under 35 USC 102(b) as being clearly anticipated by Kennel (US 5410166).

Applicant has amended claim 1 to introduce the limitation that the emitter electrode and the collector electrode each comprise a surface for positioning facing the other, and that these surfaces are substantially flat, and that topographical features of the emitter electrode surface match topographical features of the collector electrode surface.

Kennel does not teach electrodes having substantially flat surfaces and in which topographical features of one electrode are matched in the other.

Applicant respectfully requests that Examiner's objections to claims 1, 2 and 7 be withdrawn.

CLAIM REJECTION - 35 USC 102(b) Hatsopoulos and Gyftopoulos

Claims 1, 2, 4, 7, 23 and 24 stand rejected under 35 USC 102(b) as being clearly anticipated by Hatsopoulos and Gyftopoulos (H&G).

Applicant has amended claims 1 and 23 to introduce the limitation that the emitter electrode and the collector electrode each comprise a surface for positioning facing the other, and that these surfaces are substantially flat, and that topographical features of the emitter electrode surface match topographical features of the collector electrode surface.

Hatsopoulos and Gyftopoulos do not teach electrodes having substantially flat surfaces and in which topographical features of one electrode are matched in the other.

Applicant respectfully requests that Examiner's objections to claims 1, 2, 4, 7, 23 and 24 be withdrawn.

CLAIM REJECTION - 35 USC 102(e) DiMatteo

Claims 1, 2, 8, 10, 13-16, 23, 24 and 27 stand rejected under 35 USC 102(e) as being clearly anticipated by DiMatteo (US 6084173).

Di Matteo discloses a heated surface in very close proximity to a thermovoltaic element, semiconductor receiver or photovoltaic cell. In photo- and thermo-voltaics, "a semiconductor p-n junction is formed close to the surface of the semiconductor material that forms the cell. When photons emitted by a light source such as the sun impinge on the cell surface, electron-hole pairs are created. These electron-hole pairs are separated by the space-charge potential that is a consequence of the p-n junction. The net result is a DC current. Thermophotovoltaics operate in a similar manner except that, instead of a light source, a surface at a higher temperature than the semiconductor material acts as the source of photons. In this case, thermal radiation is the mechanism of energy transfer and the temperature of the emitting surface which dictates the spectral composition of the radiation must be matched to the material and electronic properties of the semiconductor such as its bandgap in order to optimize conversion efficiency." (DiMatteo, column 1, lines 15-31).

Examiner asserts that "DiMatteo teaches an energy converter having an emitter 1". It is clear from DiMatteo's disclosure that the emitter is a heated surface that emits *radiation* (column 2, line 64). It is also very clear from the context that the radiation is *photon* radiation (see above). It is equally clear that DiMatteo's emitter is *not* an electrode, as in the present invention, but a *radiator*.

Examiner also asserts that DiMatteo "teaches a collector 2 connected to a cool source". It is very clear from DiMatteo's disclosure that the collector is in fact a receiver of the *photon radiation* emitted from the hot surface. It is equally clear that DiMatteo's collector is *not* an electrode, as in the present invention, but a *receiver* of photons.

More importantly, DiMatteo does not disclose a circuit connecting the emitter and the receiver, which is an element of the present invention and allows electrons to flow in an external circuit between the emitter electrode and the collector electrode.

Thus Examiner has not provided any elements in DiMatteo corresponding to Applicant's "emitter *electrode*", "collector *electrode*", and "an electrical circuit connecting said electrodes".

For a rejection under 35 USC 102, Examiner has to demonstrate that there is no difference between Applicant's invention and DiMatteo's invention.

Failure of the Examiner to provide elements in DiMatteo corresponding to Applicant's "emitter *electrode*", "collector *electrode*", and "an electrical circuit connecting said electrodes" renders the rejection of claims 1, 2, 8, 10, and 13-16 under 35 USC 102(b) untenable, and Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

Applicant has amended claim 23 to introduce the limitation that topographical features of one electrode surface match topographical features of the other electrode surface.

Examiner has provided no argument in paragraph 5 of the Office Action mailed 11 December 2002 as to why claims 23, 24 and 27 are rejected under 35 USC 102(b) as being clearly anticipated by DiMatteo. Applicant therefore respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 102(e) Rason

Claims 23 and 28 stand rejected under 35 USC 102(e) as being clearly anticipated by Rason et al (US 3843896).

Examiner has not responded to Applicant's arguments in relation to this objection made in the Amendment filed 23 October 2002, and Examiner's Objections in paragraph 6 of the Office Action mailed 11 December 2002 are the same as in paragraph 10 of the Office Action mailed 26 June 2002.

Applicant has amended claim 23 to introduce the limitation that topographical features of one electrode surface match topographical features of the other electrode surface.

In paragraph 6 of the Office Action mailed 11 December 2002, Examiner provides no corresponding element in Rason corresponding to "wherein topographical features of one electrode surface match topographical features of the other electrode surface."

For a rejection under 35 USC 102, Examiner has to demonstrate that there is no difference between Applicant's invention and Rason's invention.

Failure of the Examiner to provide elements in Rason corresponding to Applicant's "topographical features of one electrode surface match topographical features of the other electrode surface" renders the rejection of claims 23 and 28 under 35 USC 102(e) untenable, and Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 102(b) Fitzpatrick et al

Claims 1, 2, 7-10, 13, 14, 23, 24, 27, 50, 53 and 61 stand rejected under 35 USC 102(b) as being clearly anticipated by Fitzpatrick et al ("Close-Spaced Thermionic Converters with Active Spacing Control and Heat Pipe Isothermal Emitters").

Applicant has amended claims 1 and 23 to introduce the limitation that the emitter electrode and the collector electrode each comprise a surface for positioning facing the other, and that these surfaces are substantially flat, and that topographical features of the emitter electrode surface match topographical features of the collector electrode surface.

Fitzpatrick does not teach pairs of electrodes having substantially smooth surfaces in which any topographical features in one are matched in the other. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 102(b) Cox

Claims 23, 33 and 65 stand rejected under 35 USC 102(e) as being clearly anticipated by Cox (US 6064137).

Applicant has amended claim 23 to introduce the limitation that topographical features of one electrode surface match topographical features of the other electrode surface.

Cox does not teach pairs of electrodes having substantially smooth surfaces in which any topographical features in one are matched in the other. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 103 H&G, Kennel, Fitzpatrick or DiMatteo in further view of Rason et al (US 3843896)

Claim 3 stands rejected as being unpatentable over H&G, Kennel, Fitzpatrick or DiMatteo in further view of Rason et al (US 3843896). Applicant has argued above that H&G, Kennel, Fitzpatrick or DiMatteo do not teach every aspect of the invention, and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 103 DiMatteo in further view of Cox (US 6064137)

Claim 17 stands rejected as being unpatentable over DiMatteo in further view of Cox (US 6064137). Applicant has argued above that DiMatteo does not teach every aspect of the invention, and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 103 DiMatteo or H&G or Fitzpatrick

Claims 25, 26, and 54-56 stand rejected as being unpatentable over DiMatteo or H&G or Fitzpatrick. Applicant has argued above that DiMatteo and H&G do not teach every aspect of the invention, and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 103 Fitzpatrick in further view of Richards (US 4281280) and Edelson (US 5874039)

Claims 28-32 stand rejected as being unpatentable over Fitzpatrick in further view of Richards (US 4281280) and Edelson (US 5874039). Applicant has argued above that Fitzpatrick does not teach every aspect of the invention, and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 103 Rason in further view of Richards and Edelson

Claims 29-32 stand rejected as being unpatentable over Rason in further view of Richards and Edelson. Applicant has argued above that Rason does not teach every aspect of the invention, and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 103 Cox

Claim 34 stands rejected as being unpatentable over Cox. Applicant has argued above that Cox does not teach every aspect of the invention, and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 103 Cox in further view of Fitzpatrick et al

Claim 36 stands rejected as being unpatentable over Cox in further view of Fitzpatrick et al. Applicant has argued above that Cox does not teach every aspect of the invention, and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 103 Fitzpatrick (US 4667126) in further view of Fitzpatrick et al

Claim 37 stands rejected as being unpatentable over Fitzpatrick (US 4667126) and Fitzpatrick et al. Applicant has argued above that Fitzpatrick et al does not teach every aspect of the invention, and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 103 Fitzpatrick et al and Richards

Claim 51 stands rejected as being unpatentable over Fitzpatrick et al and Richards. Applicant has argued above that Fitzpatrick et al does not teach every aspect of the invention, and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 103 Fitzpatrick et al and Sliwa (US5307311)

Claim 52 stands rejected as being unpatentable over Fitzpatrick et al and Sliwa (US5307311). Applicant has argued above that Fitzpatrick et al does not teach every aspect of the invention, and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 103 Fitzpatrick et al and Richards

Claims 57-60 stand rejected as being unpatentable over Fitzpatrick et al and Richards. Applicant has argued above that Fitzpatrick et al does not teach every aspect of the invention,

and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CLAIM REJECTION - 35 USC 103 Fitzpatrick et al and Cox, and Richards

Claim 61 stands rejected as being unpatentable over Fitzpatrick et al and Cox, and Richards. Applicant has argued above that Fitzpatrick et al does not teach every aspect of the invention, and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

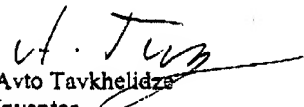
CLAIM REJECTION - 35 USC 103 Cox

Claims 67 and 68 stand rejected as being unpatentable over Cox. Applicant has argued above that Cox does not teach every aspect of the invention, and therefore the 35 USC 103(a) rejection is not tenable. Applicant respectfully requests that Examiner's objections to these claims be withdrawn.

CONCLUSION

Applicant respectfully submits that this application, as amended, is in condition for allowance, and such disposition is earnestly solicited. If the Examiner believes that discussing the application the Applicant over the telephone might advance prosecution, Applicant would welcome the opportunity to do so.

Respectfully submitted,


Avto Tavkhelidze
Inventor

FAX RECEIVED

FEB 11 2003

TECHNOLOGY CENTER 2800

Proprietary and Confidential. Property of Borealis Technical Limited
Title: DIODE DEVICE. Filed August 31, 1998
Response to Final Office Action after RCE. Faxed: February 11, 2003
Avto Tavkhelidze and Jonathan Edelson

Page 11 of 13

Version of Amended Claim 1 with markings to show changes made**1) Apparatus for the conversion of energy comprising:**

- a) a source of energy;
- b) an emitter electrode connected to said source of energy;
- c) a collector electrode,
- d) an electrical circuit connecting said electrodes; and
- e) manipulating means for controlling the distance separating said electrodes ,
connected to either or both of said electrodes;

wherein said [distance separating said emitter electrode and said collector electrode is sufficiently small for electrons to tunnel from said emitter electrode to] emitter electrode and said collector electrode each comprise a surface for positioning facing the other. wherein said surfaces are substantially flat and wherein topographical features of said emitter electrode surface match topographical features of said collector electrode surface.

Version of Amended Claim 23 with markings to show changes made

- 23) A first and a second electrode for use in a diode device, each electrode having a surface for positioning facing the other electrode, wherein said surfaces are substantially flat and wherein [surface]topographical features of one electrode surface match [surface]topographical features of the other electrode surface.

FAX RECEIVED

FEB 11 2003

TECHNOLOGY CENTER 2800

Proprietary and Confidential, Property of Borealis Technical Limited
Title: DIODE DEVICE, Filed August 31, 1998
Response to Final Office Action after RCE, Faxed: February 11, 2003
Avto Tavkhelidze and Jonathan Edelson

Page 13 of 13